TASK 2 – SCORING CRITERIA[1]

To identify a methodology that can determine if a requested land use change in the Lake Okeechobee watershed will (or will not) increase the phosphorus load relative to an existing land use, the following considerations must be given:

1. the selected methodology will be applied to land parcels of several thousand acres or less;
2. the selected methodology will provide reliable results;
3. implementation of the selected methodology will not require an extensive data collection effort (e.g. observing stream discharges or collecting and analyzing water samples for phosphorus concentration);
4. the selected methodology should be straight-forward and easy to use;
5. methodology results generated by one party should be reproducible by a second, when provided with correct input data;
6. the selected methodology likely will be used by an engineer/scientist acting as a consultant for any landowner who wishes to change land use.

Methodologies that clearly do not satisfy at least one of these requirements will be eliminated, giving the selected methodology an adequate level of technical acceptability and economic viability. Technical acceptability refers to a history of satisfactory validation for land use, soil, physiographic, and weather conditions similar to those in the Lake Okeechobee watershed. Economic viability refers to issues of acquisition and licensing, the portability of the code to various platforms, minimal and easily developed inputs, and ease of application by a new user. That is, the intended users of the methodology are not expected to be model developers, and recoding or programming the methodology is unnecessary. Therefore, the extent to which the methodology has been designed for users without requiring intimate knowledge of the program is an important feature for this review. It is important to note that this task is not a comprehensive methodology review, but is a review specific to the previously outlined requirements.

Preliminary Screening Categories and Scoring System

The list of categories presented here shall be used for preliminary screening. A scoring system of 1 to 5 will be used throughout the screening process, with 1 being the least suitable (low end of the scale) and 5 being the most suitable. A list of criteria that will be used for the scoring system is provided under each category. A score of 1 will be assigned to all the categories that did not meet the criteria and a score of 5 will be assigned to a category that meets all the requirements. Then, the scores will be compiled to select the top candidate methodologies. These methodologies will be examined using the secondary screening. Categories for the secondary screening are listed in the latter part of this report.

1. The methodology should be applicable to land use, soil, physiographic, and weather conditions found in the Lake Okeechobee watershed. The methodology should be applicable to land parcels ranging in size from a few hundred to several thousand acres. The methodology should have a satisfactory record of application, spanning five or more years.

   Reasons for the category: Methodologies must gain user acceptance through the peer review process and be applicable to conditions found in the Lake Okeechobee watershed. From three to five years are required for a new methodology to undergo development, be implemented, and

[1] This report is based on a memorandum submitted as the task 2 project deliverable by R. Srinivasan.

gain user community acceptance. However methodologies based on existing proven technologies may require less time for development, application, and testing.

Scoring criteria: 1 – The methodology is relatively new and has not been applied to Lake Okeechobee watershed conditions. 2 – The methodology is relatively new and has limited application to Lake Okeechobee watershed conditions. 3 – The methodology has gained limited acceptance and has been applied to Lake Okeechobee watershed conditions. 4 – The methodology is well accepted and has been applied to Lake Okeechobee watershed conditions. 5 – The methodology has been developed, applied, and tested specifically for the Lake Okeechobee watershed. Several applications to the Lake Okeechobee watershed have been published in the peer reviewed literature.

2. The methodology should be available for distribution at no or minimal cost.

   Reasons for the category: Methodology acquisition should not add an additional burden to end-users. If the methodology cannot be freely distributed, support and interest will be significantly reduced.

   Scoring criteria: 1 – The methodology is not in the public domain, and users must expend resources to obtain it. 2 – The methodology is not in the public domain, but users need not expend significant resources to obtain it. 3 – The methodology is in the public domain, but users must expend resources to obtain it. 4 – The methodology is in the public domain, and users need not expend significant resources to secure it. 5 – The methodology is in the public domain, and users need not expend resources to obtain it.

3. Any methodology implemented as a computer program should execute on a variety of PC operating systems, such as Windows 3.1/95/98/ME/NT/2000/XP.

   Reasons for the category: End users shouldn't be required to use expensive, high performance computers and operating systems that require extensive training to operate.

   Scoring criteria: 1 – The computer program cannot run on Windows operating systems. 2 – The computer program runs on Windows 3.1/95 operating systems. 3 – The computer program runs on Windows 3.1/95/98 operating systems. 4 – The computer program runs on Windows 3.1/95/98/NT/2000 operating systems. 5 – The computer program runs on Windows 3.1/95/98/ME/NT/2000/XP operating systems. Methodologies that do not use a computer program will be given a score of five.

4. Data requirements for the application of a methodology should be minimal and practical, without excessive cost for end users.

   Reasons for the category: A methodology's data requirements should be minimal, in order to ease manpower, resource, and time costs associated with data acquisition and methodology application.

   Scoring criteria: 1 – Field data collection and/or laboratory tests are required. 2 – Data are difficult to estimate or derive from existing sources. 3 – Data can be estimated or derived from existing sources. 4 – Data are mostly available or can be derived from readily available information. 5 – Data can be obtained easily.

5. The user should be able to assemble methodology input with minimal effort and should be able to easily understand methodology results. Model setup and execution should take less than a day for a 30 year analysis. Expertise requirements should be minimal, as reflected by methodology complexity and input requirements.

   Reasons for the category: Complex methodologies require users to spend too much time understanding functionality, developing input data sets, and understanding results.

   Scoring criteria: 1 – The methodology is complex. Two to three weeks are required to assemble input data sets, implement the methodology, and analyze results. 2 – The methodology is complex, but inputs are readily available. One week is required to assemble input, implement the methodology, and analyze results. 3 – The methodology is straightforward and inputs are readily available. One to two days are required to assemble input, implement the methodology, and analyze results. 4 – The methodology is simple and input data are readily available. About one day is required to assemble input, implement the methodology, and analyze results. 5 – The methodology is simple and input data are available. About eight hours are required to assemble input, implement the methodology, and analyze results.

Secondary Screening Categories and Scoring System

The following categories will be used for a secondary screening. Emphasis is placed on how well a methodology handles best management practices (BMPs), the ability of District staff to reproduce results submitted by another party, methodology documentation, and the level of expertise District staff have with a particular methodology. A scoring system similar to the preliminary screening will be used, in which a score from one (lowest score) to five (highest score) is awarded.

1. The methodology should be able to examine the impacts of BMPs that are used in the Lake Okeechobee watershed.

   Reasons for the category: A large number of BMPs need to be evaluated without requiring significant changes to the methodology.

   Scoring criteria: 1 – The methodology cannot examine BMPs used in the Lake Okeechobee watershed. 2 – The methodology can examine BMPs, but a significant amount of additional data is required. 3 – The methodology can examine BMPs by making internal adaptations for a particular BMP. 4 – The methodology has built-in BMPs with appropriate parameterizations for a limited number of alternative evaluations. 5 – The methodology can examine an unlimited number of BMPs by changing methodology input.

2. District staff should be able to reproduce end user results.

   Reasons for the category: Methodology results must be reproducible by District staff when disputes or questions arise. Staff also must check to make sure a methodology is applied correctly.

   Scoring criteria: 1 – District staff cannot reproduce results, because they do not have access to a proprietary methodology. 2 – District staff cannot reproduce results due to methodology

complexity. 3 – District staff can reproduce results only with partial success, due to methodology complexity. 4 – District staff can to reproduce results and reach same conclusions as end user, but require more information than end user provided. 5 – District staff can reproduce results and reach same conclusions as end user based solely on information submitted by end user.

3. The methodology should be well documented and District staff should have sufficient knowledge to help end users with applications and to write support software. Otherwise, end users will not be able to apply the methodology successfully. Documentation also should address methodology limitations, to avoid misuse.

   Reasons for the category: Without proper documentation and/or assistance from District staff, the methodology will be difficult to apply and might be misused.

   Scoring criteria: 1 – The methodology has very poor or no documentation. District staff does not have sufficient knowledge. 2 – Methodology documentation is adequate, however parameterization of input data is not clear in the documentation. District staff has very limited knowledge. 3 – Methodology documentation is well written, providing good guidance for developing input data sets. District staff has some knowledge about the methodology. 4 – Methodology documentation is very well organized, providing very good guidance for developing input data sets. District staff has good knowledge, having used the methodology. 5 – The methodology is very well documented with automated (expert system like) input parameterization and context sensitive help. District staff has detailed knowledge about the methodology.

4. The methodology should meet the Lake Okeechobee Protection Program requirement of explicitly demonstrating a change in pollutant loading corresponding to a change in land use. This requirement, as stated in legislative statute, is "Prior to authorizing a discharge into works of the district, the district shall require responsible parties to demonstrate that proposed changes in land use will not result in increased phosphorus loading over that of existing land uses."

   Reasons for the category: This category is required as per the legislative directive to provide evidence of no net increase in phosphorus loading due to change in land use.

   Scoring criteria: 1 – The methodology does not predict changes in pollutant loading. 2 – An increase or decrease in pollutant load can be inferred weakly from methodology results. 3 – A moderate inference of increased or decreased pollutant loading can be made from methodology results. 4 – A strong inference of increased or decreased pollutant loading can be made from methodology results. 5 – The methodology directly predicts phosphorus loads, from which pre- and post land use change comparisons can be made.